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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: YGUERABIDE et al.

Title: ANALYTE ASSAY USING PARTICULATE LABELS

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PRELIMINARY AMENDMENT

Commissioner for Patents
Box Patent Application
Washington, D.C. 20231

Sir:

Please amend the application as follows:

In the Specification:

Delete the first paragraph on Page 1, and insert the following paragraph:

This application is a divisional of Yguerabide et al., U.S. Application 08/953,713, filed October 17, 1997, which is a continuation-in-part of Yguerabide et al., U.S. Application 08/844,217, filed April 18, 1997, now U.S. Patent 6,214,560, which claims the benefit of Yguerabide et al., U.S. Provisional Application 60/016,383, filed April 25, 1996, all of which are incorporated herein by reference in their entireties, including drawings.

In the Claims:

Kindly cancel claims 1-48 and insert the following new claims.

49. (New) An apparatus for analysis of a sample on a solid phase surface, comprising:

a light source oriented such that non-evanescent wave light is delivered to said sample, and

a scattered light detector located such, when said solid phase surface is present in said apparatus, said detector is on the opposite side of said solid phase surface from the side from which said light is directed to said sample,

wherein said apparatus is configured such that light scattering particles associated with said sample can be illuminated by said light under conditions which produce scattered light from said particles and said scattered light can be detected by a human eye with less than 500 times magnification and without electronic amplification.

50. (New) The apparatus of claim 49, wherein a sample device comprises said solid phase surface and said detector is essentially perpendicular to said solid phase surface when said device is present in said apparatus.

51. (New) The apparatus of claim 49, wherein said apparatus is configured to accept a sample device comprising said solid phase surface and said devise is selected from the group consisting of an array slide, an array chip, and an array plate.

52. (New) The apparatus of claim 49, further comprising a sample device comprising said solid phase surface.

53. (New) The apparatus of claim 52, wherein said sample device is selected from the group consisting of an array slide, an array chip, and an array plate.

54. (New) The apparatus of claim 52, wherein said sample device is a microtiter plate or other well-containing device.

55. (New) The apparatus of claim 53, wherein said solid phase surface is covered by a medium, thereby increasing the refractive index of the medium surrounding said light scattering particles.

56. (New) The apparatus of claim 51, further comprising a light guide for the illuminating light.

57. (New) The apparatus of claim 56, wherein said light guide is a prism, optical fiber, or optical fiber bundle.

58. (New) The apparatus of claim 49, further comprising one or more lenses through which illuminating light passes, for collecting or focusing or both said illuminating light.

59. (New) The apparatus of claim 49, further comprising a collection lens to collect said scattered light for directing to said scattered light detector.

60. (New) The apparatus of claim 49, further comprising one or more lenses to provide a focused image of said sample.

61. (New) The apparatus of claim 49, further comprising at least one optical filter, arranged such that illuminating light, or scattered light, or both will pass through at least one said optical filter.

62. (New) The apparatus of claim 61, wherein said optical filter is selected from the group consisting of a narrow band pass filter, a cutoff filter, and a polarizer.

63. (New) The apparatus of claim 49, further comprising an electronic detector for detecting scattered light.

64. (New) The apparatus of claim 63, further comprising an image processor that discriminates light scattering signals based on color or intensity or both.

65. (New) The apparatus of claim 49, wherein said light source is selected from the group consisting of light emitting diode (LED), laser diode, discharge lamp, and filament lamp.

66. (New) The apparatus of claim 49, further comprising a particle counter having necessary computer software or firmware configured to detect said scattered light and count the number of said light scattering particles in a selected area.

67. (New) The apparatus of claim 49, further comprising an integrated light intensity detector having necessary computer software or firmware configured to detect said scattered light.

68. (New) The apparatus of claim 49, further comprising an integrated light intensity detector and a particle counter, including necessary computer software or firmware configured to detect said scattered light.

69. (New) The apparatus of claim 49, further comprising a photodetector selected from the group consisting of a still camera, a video camera, and a CCD device, configured to detect said scattered light.

70. (New) The apparatus of claim 49, wherein said apparatus is configured to allow assay of a microarray.

71. (New) The apparatus of claim 70, wherein each separate area of said microarray has a dimension between ten square microns and one square millimeter.

72. (New) The apparatus of claim 70, wherein each separate area of said microarray has a dimension greater than one square millimeter.

73. (New) The apparatus of claim 71, wherein said apparatus detects the number of particles in each of said separate areas.

74. (New) The apparatus of claim 72, wherein said apparatus detects the number of particles in each of said separate areas.

75. (New) The apparatus of claim 71, wherein said apparatus is configured to detect the light intensity in each of said separate areas.

76. (New) The apparatus of claim 72, wherein said apparatus is configured to detect the light intensity in each of said separate areas.

77. (New) The apparatus of claim 49, wherein said apparatus is configured to detect and distinguish light scattered from a plurality of different particle types.

78. (New) The apparatus of claim 77, wherein said apparatus distinguishes different particles by color.

79. (New) The apparatus of claim 77, wherein said apparatus distinguishes different particles by intensity.

80. (New) The apparatus of claim 77, wherein said apparatus distinguishes different particles by peak light scattering wavelength.

81. (New) The apparatus of claim 78, wherein said apparatus comprises a plurality of different bandpass filters to provide separate detection of light scattered from different particle types.

82. (New) An apparatus for analysis of a sample on a solid phase surface, comprising:

a light source oriented such that non-evanescent wave light is delivered to said sample after passing through said surface when said solid phase surface is present in said apparatus, wherein in passing through said solid phase surface said light passes from a medium of higher refractive index into a medium of lower refractive index, whereby a critical angle is defined, and

a scattered light detector located such that said detector is on the same side of said solid phase surface as said light source when said solid phase surface is present in said apparatus and said detector and said light source are both closer to the perpendicular from said solid phase surface than said critical angle,

wherein said apparatus is configured such that light scattering particles associated with said sample can be illuminated by said light under conditions which produce scattered light from said particles and said scattered light can be detected by a human eye with less than 500 times magnification and without electronic amplification.

83. (New) The apparatus of claim 82, wherein a sample device comprises said solid phase surface and said detector is essentially perpendicular to said solid phase surface when said device is present in said apparatus.

84. (New) The apparatus of claim 82, wherein said apparatus is configured to accept a sample device comprising said solid phase surface and said devise is selected from the group consisting of an array slide, an array chip, and an array plate.

85. (New) The apparatus of claim 82, further comprising a sample device comprising said solid phase surface.

86. (New) The apparatus of claim 85, wherein said sample device is selected from the group consisting of an array slide, an array chip, and an array plate.

87. (New) The apparatus of claim 85, wherein said sample device is a microtiter plate or other well-containing device.

88. (New) The apparatus of claim 86, wherein said solid phase surface is covered by a medium, thereby increasing the refractive index of the medium surrounding said light scattering particles.

89. (New) The apparatus of claim 84, further comprising a light guide for the illuminating light.

90. (New) The apparatus of claim 89, wherein said light guide is a prism, optical fiber, or optical fiber bundle.

91. (New) The apparatus of claim 82, further comprising one or more lenses through which illuminating light passes, for collecting or focusing or both said illuminating light.

92. (New) The apparatus of claim 82, further comprising a collection lens to collect said scattered light for directing to said scattered light detector.

93. (New) The apparatus of claim 82, further comprising one or more lenses to provide a focused image of said sample.

94. (New) The apparatus of claim 82, further comprising at least one optical filter, arranged such that illuminating light, or scattered light, or both will pass through at least one said optical filter.

95. (New) The apparatus of claim 94, wherein said optical filter is selected from the group consisting of a narrow band pass filter, a cutoff filter, and a polarizer.

96. (New) The apparatus of claim 82, further comprising an electronic detector for detecting scattered light.

97. (New) The apparatus of claim 96, further comprising an image processor that discriminates light scattering signals based on color or intensity or both.

98. (New) The apparatus of claim 82, wherein said light source is selected from the group consisting of light emitting diode (LED), laser diode, discharge lamp, and filament lamp.

99. (New) The apparatus of claim 82, further comprising a particle counter having necessary computer software or firmware configured to detect said scattered light and count the number of said light scattering particles in a selected area.

100. (New) The apparatus of claim 82, further comprising an integrated light intensity detector having necessary computer software or firmware configured to detect said scattered light.

101. (New) The apparatus of claim 82, further comprising an integrated light intensity detector and a particle counter, including necessary computer software or firmware configured to detect said scattered light.

102. (New) The apparatus of claim 82, further comprising a photodetector selected from the group consisting of a still camera, a video camera, and a CCD device, configured to detect said scattered light.

103. (New) The apparatus of claim 82, wherein said apparatus is configured to allow assay of a microarray.

104. (New) The apparatus of claim 103, wherein each separate area of said microarray has a dimension between ten square microns and one square millimeter.

105. (New) The apparatus of claim 103, wherein each separate area of said microarray has a dimension greater than one square millimeter.

106. (New) The apparatus of claim 104, wherein said apparatus detects the number of particles in each of said separate areas.

107. (New) The apparatus of claim 105, wherein said apparatus detects the number of particles in each of said separate areas.

108. (New) The apparatus of claim 104, wherein said apparatus is configured to detect the light intensity in each of said separate areas.

109. (New) The apparatus of claim 105, wherein said apparatus is configured to detect the light intensity in each of said separate areas.

110. (New) The apparatus of claim 82, wherein said apparatus is configured to detect and distinguish light scattered from a plurality of different particle types.

111. (New) The apparatus of claim 110, wherein said apparatus distinguishes different particles by color.

112. (New) The apparatus of claim 110, wherein said apparatus distinguishes different particles by intensity.

113. (New) The apparatus of claim 110, wherein said apparatus distinguishes different particles by peak light scattering wavelength.

114. (New) The apparatus of claim 111, wherein said apparatus comprises a plurality of different bandpass filters to provide separate detection of light scattered from different particle types.

115. (New) An apparatus for analysis of a sample on a solid phase surface, comprising:

a light source angled such that light is delivered to said sample without first passing through said solid phase surface when said solid phase surface is present in said apparatus, and

a scattered light detector located such that said detector is on the same side of said solid phase surface as said light source when said solid phase surface is present in said apparatus,

wherein said apparatus is configured such that light scattering particles associated with said sample can be illuminated by said light under conditions which produce scattered light from said particles and said scattered light can be detected by a human eye with less than 500 times magnification and without electronic amplification.

116. (New) The apparatus of claim 115, wherein a sample device comprises said solid phase surface and said detector is essentially perpendicular to said solid phase surface when said device is present in said apparatus.

117. (New) The apparatus of claim 115, wherein said apparatus is configured to accept a sample-bearing device selected from a slide and an array chip, wherein said slide or array chip comprises said solid phase surface.

118. (New) The apparatus of claim 115, further comprising a sample device comprising said solid phase surface.

119. (New) The apparatus of claim 118, wherein said sample device is selected from the group consisting of an array slide, an array chip, and an array plate.

120. (New) The apparatus of claim 118, wherein said sample device is a microtiter plate or other well-containing device.

121. (New) The apparatus of claim 119, wherein said solid phase surface is covered by a medium thereby increasing the refractive index of the medium surrounding said light scattering particles.

122. (New) The apparatus of claim 117, further comprising a light guide for the illuminating light.

123. (New) The apparatus of claim 122, wherein said light guide is a prism, optical fiber, or optical fiber bundle.

124. (New) The apparatus of claim 115, further comprising one or more lenses through which illuminating light passes, for collecting or focusing or both said illuminating light.

125. (New) The apparatus of claim 115, further comprising a collection lens to collect said scattered light for directing to said scattered light detector.

126. (New) The apparatus of claim 115, further comprising one or more lenses to provide a focused image of said sample.

127. (New) The apparatus of claim 115, further comprising at least one optical filter, arranged such that illuminating light, or scattered light, or both will pass through at least one said optical filter.

128. (New) The apparatus of claim 127, wherein said optical filter is selected from the group consisting of a narrow band pass filter, a cutoff filter, and a polarizer.

129. (New) The apparatus of claim 115, further comprising an electronic detector for detecting scattered light.

130. (New) The apparatus of claim 129, further comprising an image processor that discriminates light scattering signals based on color or intensity or both.

131. (New) The apparatus of claim 115, wherein said light source is selected from the group consisting of light emitting diode (LED), laser diode, discharge lamp, and filament lamp.

132. (New) The apparatus of claim 115, further comprising a particle counter having necessary computer software or firmware configured to detect said scattered light and count the number of said light scattering particles in a selected area.

133. (New) The apparatus of claim 115, further comprising an integrated light intensity detector having necessary computer software or firmware configured to detect said scattered light.

134. (New) The apparatus of claim 115, further comprising an integrated light intensity detector and a particle counter, including necessary computer software or firmware configured to detect said scattered light.

135. (New) The apparatus of claim 115, further comprising a photodetector selected from the group consisting of a still camera, a video camera, and a CCD device, configured to detect said scattered light.

136. (New) The apparatus of claim 115, wherein said apparatus is configured to allow assay of a microarray.

137. (New) The apparatus of claim 136, wherein each separate area of said microarray has a dimension between ten square microns and one square millimeter.

138. (New) The apparatus of claim 136, wherein each separate area of said microarray has a dimension greater than one square millimeter.

139. (New) The apparatus of claim 137, wherein said apparatus detects the number of particles in each of said separate areas.

140. (New) The apparatus of claim 138, wherein said apparatus detects the number of particles in each of said separate areas.

141. (New) The apparatus of claim 137, wherein said apparatus is configured to detect the light intensity in each of said separate areas.

142. (New) The apparatus of claim 138, wherein said apparatus is configured to detect the light intensity in each of said separate areas.

143. (New) The apparatus of claim 115, wherein said apparatus is configured to detect and distinguish light scattered from a plurality of different particle types.

144. (New) The apparatus of claim 143, wherein said apparatus distinguishes different particles by color.

145. (New) The apparatus of claim 143, wherein said apparatus distinguishes different particles by intensity.

146. (New) The apparatus of claim 143, wherein said apparatus distinguishes different particles by peak light scattering wavelength.

147. (New) The apparatus of claim 144, wherein said apparatus comprises a plurality of different bandpass filters to provide separate detection of light scattered from different particle types.

REMARKS

Support for the preceding new claims is provided in the original claims, in the claims of the related provisional application, and in the specification. Thus, no new matter is presented.

Applicant believes that the present application is now in condition for allowance. Favorable consideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

Respectfully submitted,

Date 16 August 2001

By [signature]

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